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Forest Pest Management
Pacific Northwest Region

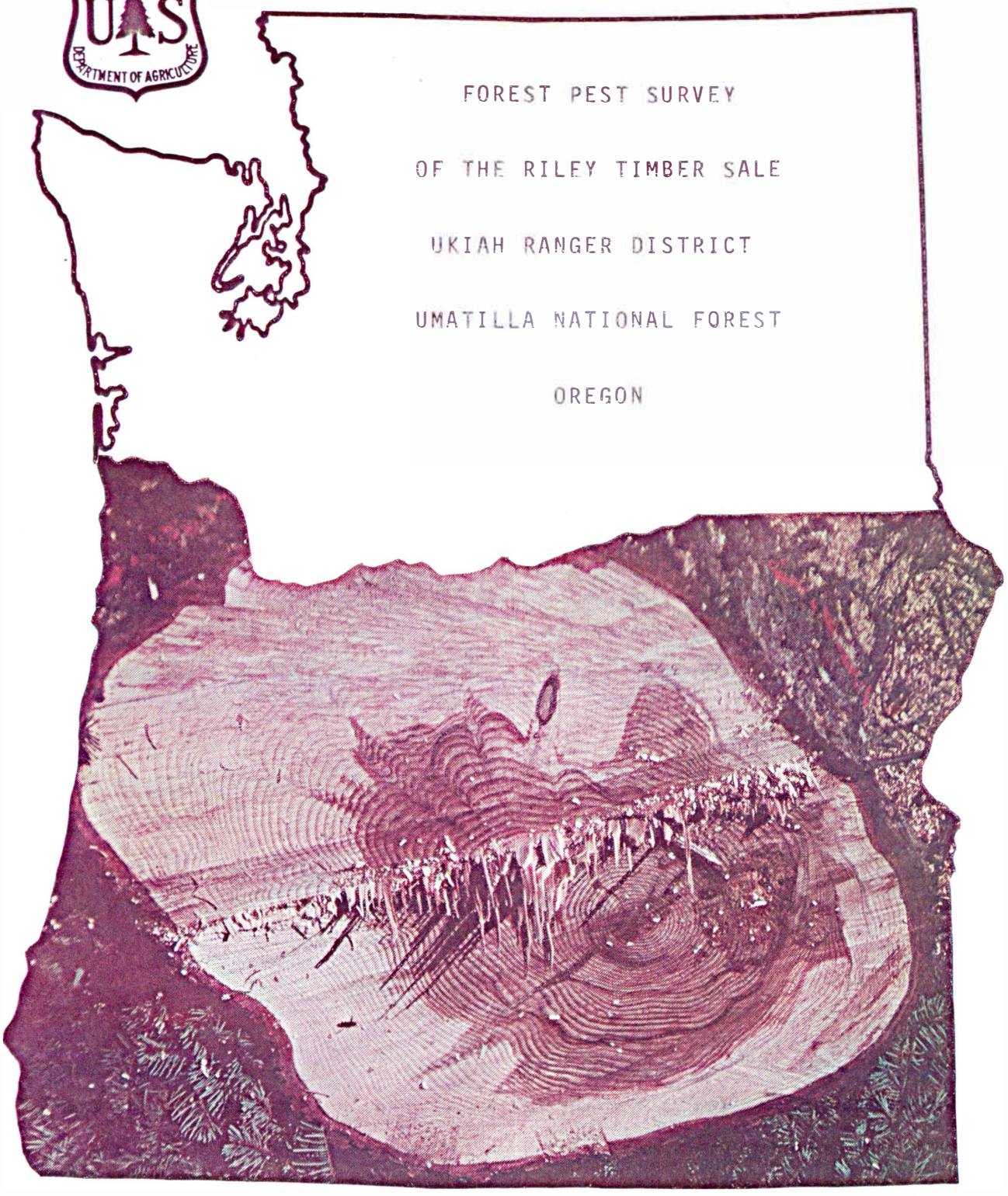
FOREST PEST SURVEY

OF THE RILEY TIMBER SALE

UKIAH RANGER DISTRICT

UMATILLA NATIONAL FOREST

OREGON



Forest Pest Survey of the Riley Timber Sale
Ukiah Ranger District
Umatilla National Forest, Oregon

by

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SUMMARY

In August 1983, 34 units of the Riley Timber Sale, totalling 600 acres, were surveyed on the ground for extent and location of major forest pests. Dwarf mistletoes were the most frequently encountered forest pests infecting western larch, Douglas-fir, grand fir, ponderosa pine, and lodgepole pine. Twenty-two units contained stumps infected with *Fomes annosus*. Laminated root rot was found to be damaging in only a portion of one unit. Heartrot, caused by the Indian paint fungus, was common throughout the sale area. Scattered mortality caused by Armillaria root rot and bark beetles was found in almost all areas surveyed. Disease management strategies are discussed for each pest.

INTRODUCTION

On August 9 through 16, 1983, a Forest Pest Management pathology crew surveyed 34 units in the Riley Sale, Ukiah Ranger District, Umatilla National Forest. District personnel had noticed tree mortality and blowdown in this area and suspected root rot was responsible. They requested a biological evaluation to determine general distribution of disease and insect activity in the sale units and provide pest management recommendations. The units are scheduled for clearcutting, and the silvicultural staff is anxious to incorporate pest control strategies into regeneration plans.

METHODS

The units were surveyed by running a series of transects at 2-chain intervals across each unit. Distances along each transect were measured using a model M-25 hip chain, and all areas between lines were reconnoitered. All dead, symptomatic, and windthrown trees and all stumps in areas that had been logged in the past were examined for evidence of root disease or insect infestation.

Two roots on opposite sides of standing dead or symptomatic trees were excavated to a distance of 3 feet from the root collar and examined for evidence of root disease. Roots and butts of stumps, windthrown trees, and dead standing trees were dissected to determine character of wood decay.

Trunks of trees were examined for signs and symptoms of heartrot, including conks and large wounds, and bark was removed from stems of dead trees to expose bark beetle galleries, if present, for species determination. Crowns of trees were examined for the presence of witches'-brooms and aerial plants indicating dwarf mistletoe infection. Dwarf mistletoe severity was rated 0-6 using Hawksworth's 6-class system. Using measurements along transect lines, root disease centers were mapped for each unit. Maps were prepared only for those units with root disease. Data provided by the survey were approximate size and location of area affected by each pest.

RESULTS AND DISCUSSION

Thirty-four units were surveyed totalling 600 acres. The area was surveyed in eight days by a two-person crew.

Units surveyed in the Riley sale vary somewhat in character but tend to be flat and open. Existing stands are predominately old-growth (200+ years) and composed of several conifer species. Grand fir (*Abies grandis*), Douglas-fir (*Pseudotsuga menziesii*), and ponderosa pine (*Pinus ponderosa*) dominate with lesser amounts of lodgepole pine (*P. contorta*) and western larch (*Larix occidentalis*). Elevation ranges between 4,500 and 5,000 feet. Many units had been partially cut in the late 1960's.

Many of the stands exhibited considerable evidence of pest-caused damage (see chart). Insect pests include mountain pine beetle (*Dendroctonus ponderosae*), fir engraver (*Scolytus ventralis*), western spruce budworm (*Choristoneura occidentalis*), and larch casebearer (*Coleophora laricella*).

Mountain pine beetle has caused extensive mortality on the Umatilla National Forest in the past decade, and 20 units in the Riley Sale Area show lodgepole pine mortality. The beetles infest trees that are low in vigor, generally as a result of stand maturation and stagnation. Stocking level control will reduce future epidemics of mountain pine beetle in lodgepole pine.

Larch casebearer periodically causes extensive defoliation of western larch, primarily resulting in tree growth loss. Tree mortality is rare. Introduced parasites of the casebearer should reduce damage caused by this insect.

Spruce budworm damage is moderate to severe throughout the Riley Sale Area. In the summer of 1983, the units were sprayed with carbaryl. This should reduce future insect populations.

Dwarf mistletoes were found on several tree species, namely *Arceuthobium douglasii* on Douglas-fir and grand fir, *A. campylopodum* on ponderosa pine, and *A. americanum* on lodgepole pine. Particularly damaging is *A. laricis* on western larch. Mortality caused by dwarf mistletoes is present throughout the sale area as are living, severely infected trees with advanced symptoms of decline.

Heartrot, caused by the Indian paint fungus, *Echinodontium tinctorium*, is present in nearly every unit as determined by conks in old-growth grand firs. The fungus attacks suppressed advanced regeneration and may remain dormant for decades before causing decay. Wounds in the vicinity of dormant infections activate the fungus which can cause extensive decay, especially in trees over 120 years old. Most of the advanced grand fir regeneration in the Riley Sale probably is infected with *E. tinctorium*.

Many lodgepole and ponderosa pines in Units 2, 6, 12, 34, 60, 67, and 68 are infected with western gall rust (*Endocronartium harknessii*). Severe infections cause stem malformations, breakage, and tree killing, especially of seedlings. The fastest growing trees are more susceptible than suppressed trees. Uninfected or lightly infected trees should be favored when thinning.

Elytroderma needle blight caused by the fungus, *Elytroderma deformans*, was found in Units 29, 31, 36, and 68. The disease is recognized by "flags" (reddened, dead 1-year-old needles with green current season's needles at tip) that are present in the spring. The fungus causes infected branches to upturn and form a large compact witches'-broom. If trees are severely infected, growth loss will occur, predisposing the trees to bark beetles or root diseases. Such trees should be removed when logging.

Damage due to rodent feeding was also found on seedlings of all species.

Root diseases caused by *Fomes annosus* and *Armillaria mellea* were found scattered throughout the area. *Phellinus weirii* is also damaging a portion of one unit, Unit 63.

Armillaria root rot was found in rather large infection centers in some units, primarily causing damage in grand fir. *A. mellea* has the potential to cause widespread mortality in mixed conifer forest types. However, in the Riley Sale Area, the fungus is acting primarily as an opportunist, affecting weakened and suppressed trees. *A. mellea* frequently affects grand firs that are attacked by fir engravers, and the two pests often contribute to tree decline and death.

F. annosus is presently one of the more damaging pests in the Riley Sale Area. Twenty-two units contained stumps infected with *F. annosus*. Most infected areas are small, but seven units contain moderate to large centers (see chart). The occurrence of *F. annosus* at high levels in grand fir stumps in the surveyed area is reason for concern. The effects of *F. annosus* on grand fir are not well known, but it may be contributing to some mortality in combination with other root pathogens and pests. It is likely more annosus root and butt rot will be discovered when the trees are cut. Hollows, advanced decay, and stain on the stump surfaces of grand fir are indicators of annosus. Also, patches of fir engraver-killed grand firs are likely to be infected by *F. annosus*.

F. annosus has a wide host range that includes most conifers, so potentially it may cause damage even if tree species are changed. Damage will probably be minimal, however. Douglas-fir is not highly susceptible to annosus root rot so, if favored in regeneration, there should be no problem. Also, the strain of *F. annosus* that infects grand fir will not seriously affect ponderosa pine, so this species can also be planted or favored. Larch does not appear to be seriously affected by annosus root rot.

RECOMMENDATIONS

In most of the units surveyed, disease- and insect-caused mortality will be insignificant in the next rotation if all diseased residuals or advanced regeneration is destroyed during logging.

In areas where dwarf mistletoe is moderate to heavy (Units 19, 36, 40, 44, and 48), provide a 75- to 100-foot buffer zone along the edge of the stand to prevent infection of the plantation from surrounding stands. This buffer zone can be a clearcut area or a planted strip of nonsusceptible species. For example, in areas where Douglas-fir mistletoe is a problem, plant a ponderosa pine strip. In areas with ponderosa pine dwarf mistletoe, plant Douglas-fir. If mistletoe-infected seed trees or shelterwood trees need to be retained, promptly remove overstory before susceptible regeneration reaches 3 feet tall or ten years old, whichever occurs first. Dwarf mistletoe can be eradicated from the clearcut units if all trees are removed by logging or site preparation. Do not attempt to save advanced regeneration if overstory trees of the same species are severely infected by mistletoe.

Unit 63 is infected by *P. weirii*. Following harvest, regenerate the unit with tree species immune, resistant, or intermediately susceptible to laminated root rot. Ponderosa pine would do well. Larch may experience some butt rot from laminated root rot, but tree killing is uncommon. Do not regenerate infected portions of this unit with grand fir or Douglas-fir because losses would probably be even greater in the developing plantation.

Units with high levels of annosus root rot in stumps (29, 35, 37, 39, 40, 50, 53, 55, 58, and 60) should not be regenerated with grand fir, especially within 50 feet of infected stumps. Instead, Douglas-fir, larch, or pine should be planted.

Heartrot, caused by Indian paint fungus, is present in old-growth grand fir. It should not be a problem if grand fir crop trees are kept vigorous and wounding is minimized during future entries. A program is available from FPM to evaluate the amount of infection and decay caused by *E. tinctorium* in grand fir.

In general, grand fir should be discriminated against in all units because of potential damage from root diseases, primarily annosus root rot, Armillaria root rot, and laminated root rot. Indian paint fungus and western spruce budworm also damage grand fir.

The information and recommendations presented in this report have been specifically formulated for the area surveyed. Although some of this information may be applied to other areas in Oregon and Washington experiencing similar pest problems, these areas may be sufficiently different from the area that we surveyed to warrant a separate biological evaluation to formulate specific management alternatives. FPM pathologists and entomologists encourage and are available to perform such evaluations at the request of land managers.

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					Pests*																	
Unit #	COMMENTS	Acres	Fomes	P. weir.	A. mell.	ET	DF DMR	GF DMR	WL DMR	PP DMR	W Gl Rust	Ely. derma	Wind-thro	Anml Dam.	WSBW	Fir Eng.	Lrh. Csbr.	NPB				
2	No Major Root Rot	10	1 pkt		2^{o}DF	X			2-6		LP							X				
6	No Root Rot	11	2 pkt		2^{o}DF						LP				X		X	X				
12	No Significant R. Rot	9			2^{o}	X			2-6		X				X			X				
19		19	2 pkt			X	4	4	2-6	3		X	LP/DF		X	X						
20		13	1 pkt						2-6						X			X				
25	Fire Scars	21	1 pkt				1									X	X	X				
28	Logging Damage	36			2^{o}GF	X	3		2-6					PP	X	X		X				
29	Slashy, Root Rot	24	3 ctr		2^{o}GF	X		2	4-6						X	X						
30		13	1 pkt		2^{o}GF	X									X	X		X				
31		26			$1^{o}2^{o}$		2		2			X			X	X	X	X				
33	Healthy; windthro. shallow rts.	14	1 pkt			X		2	2-3				GF/DF		X							
34		39	2 ctr			X			2		LP/PP		X		X	X		X				
35	Fomes in stumps, lots of blowdown	23	3 ctr			X			2-6				X		X	X						
36	Heavily Cutover	11					4					X			X	X						
37	Death of Regen. F. ann	17	1 ctr			X			3-4				LP		X		X	X				
38	Cutover	14	1 ctr	1ctr					2					Reg.	X	X						
39		17	3 ctr											Reg.	X	X		X				
40	PP Dom in SW Corner	28	1 ctr			X	4	2-4	3-6						X	X	X	X				
41		14			X				2-3						X	X		X				
42		19			X										X	X						
44	OK	11	1 ctr			X	4-6	4-6							X	X	X	X				
45		10				X		1-2	3				Reg.		X	X						
48		26	1 ctr				4-5							Reg.	X							
50	Full Crowns in Ovrstry	15	5 ctr			X			2-6							X	X	X				
51	Heavily Cut	20	1 ctr		X	X		3	3-6						X	X	X					
53	Scarred During Logging	27	1 ctr			X										X						
55	LP Mistletoe-Lt. Sca.	18	2 ctr		X				2-6						X			X				
56	LP Mistletoe-Lt. Sca.	10				X			1-2							X		X				
58	Heavily C/O F In Stmps	17	3 ctr			X		2-3							X							
60		12	1 ctr						4		LP				X	X						
63	P. weirii	13		½Sta		X									X			X				
66	Healthy	21			X										X	X		X				
67	Healthy	10			X						Reg.							X				
68	Healthy	12									LP	X			X							

*Explanation of symbols on following page.

EXPLANATION OF SYMBOLS

SPECIES - LP Lodgepole Pine

GF Grand Fir

DF Douglas-fir

PP Ponderosa Pine

DMR = Dwarf Mistletoe Rating

1 = Light 6 = Dead (corresponds to Hawksworth's 6-point rating system).

1^{o} = Primary killer

2^{o} = Secondary - Saprophytic

X = Present

Pkt. = Pocket

Ctr. = Center

Reg. = Regeneration

ET = Indian paint fungus

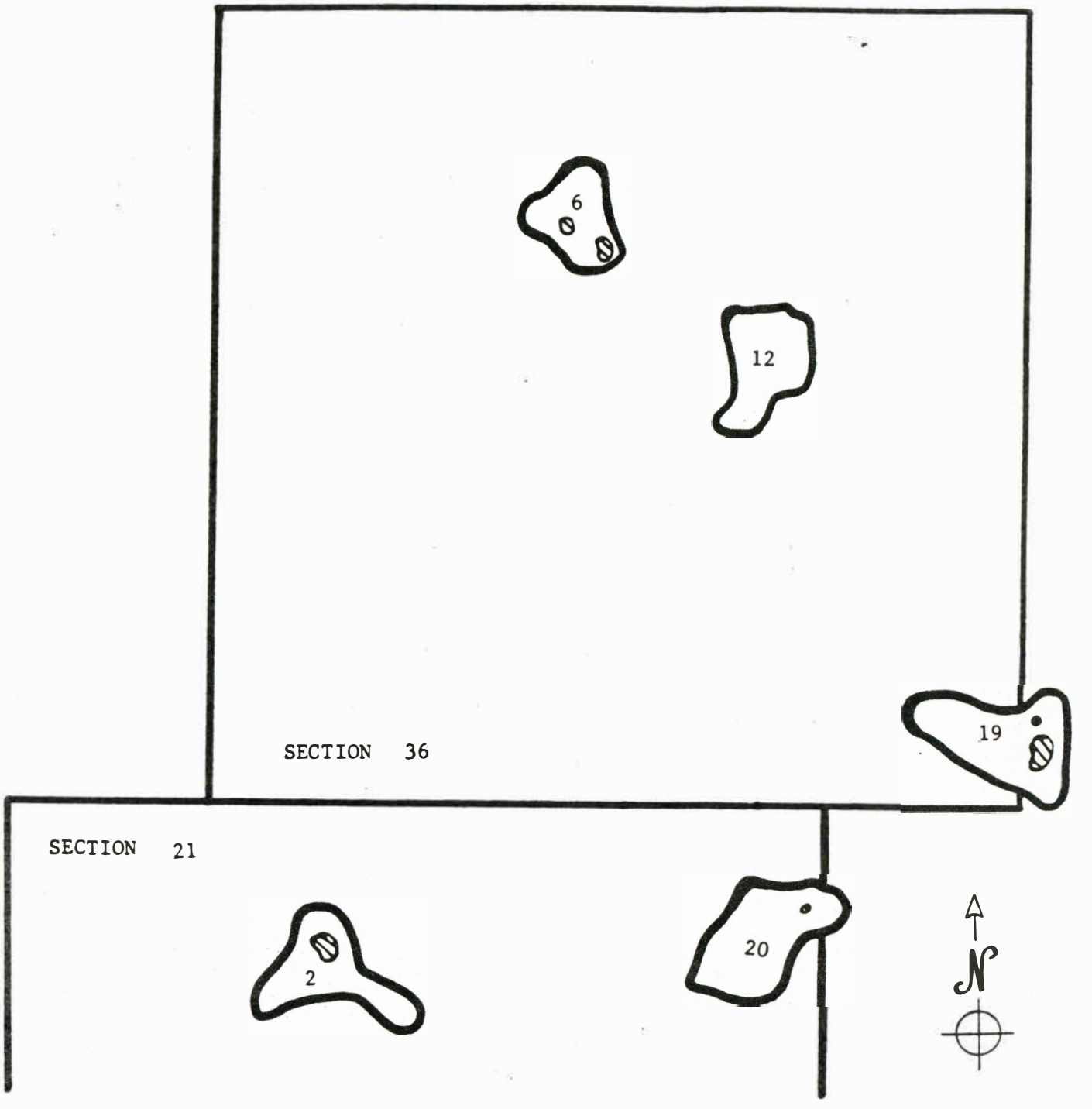


Figure 1. Location of root disease in sections 36 and 21.

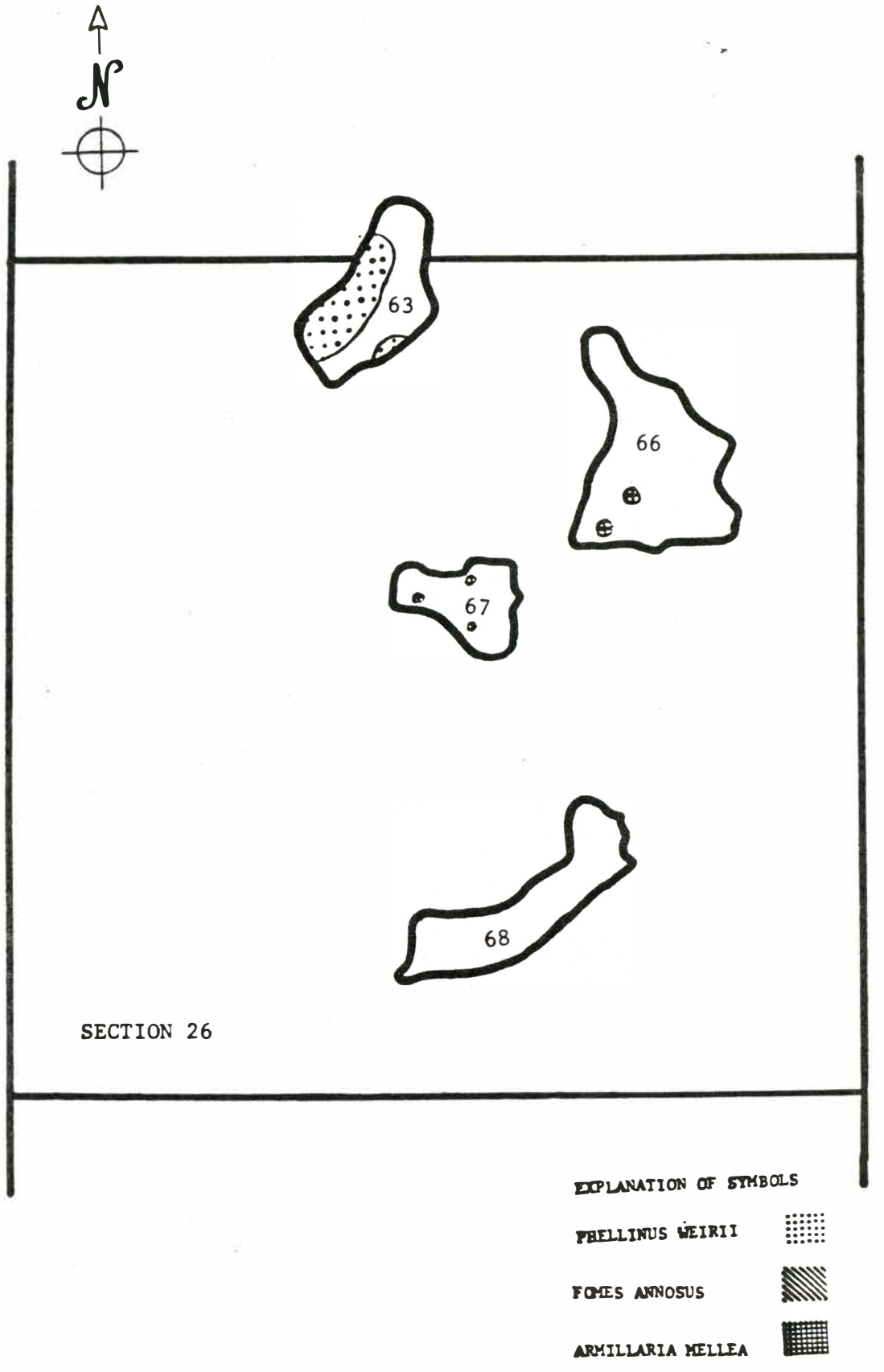


Figure 2. Location of root disease in section 26.

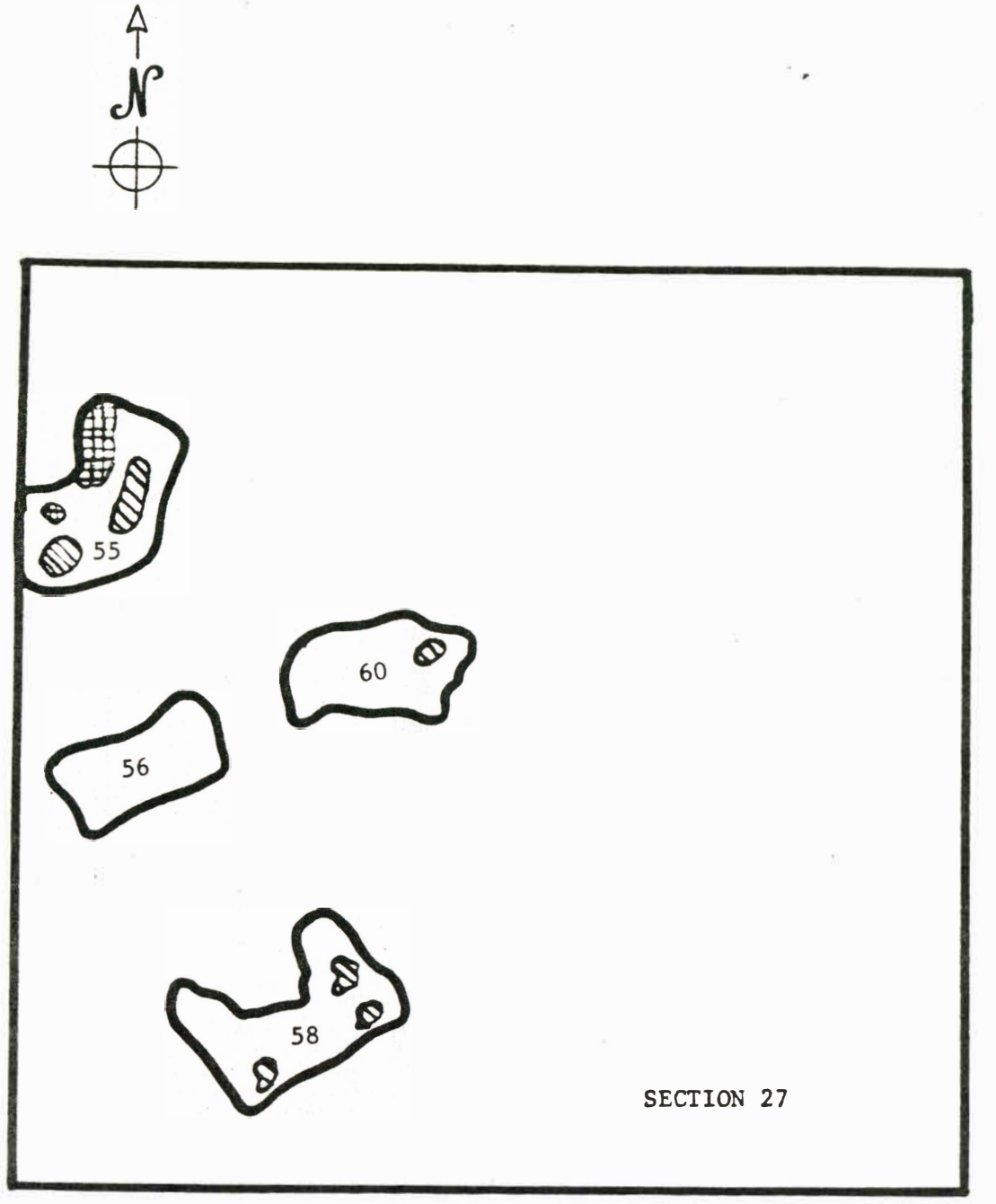


Figure 3. Location of root rot in section 27.

Figure 4. Location of root rot in section 28.

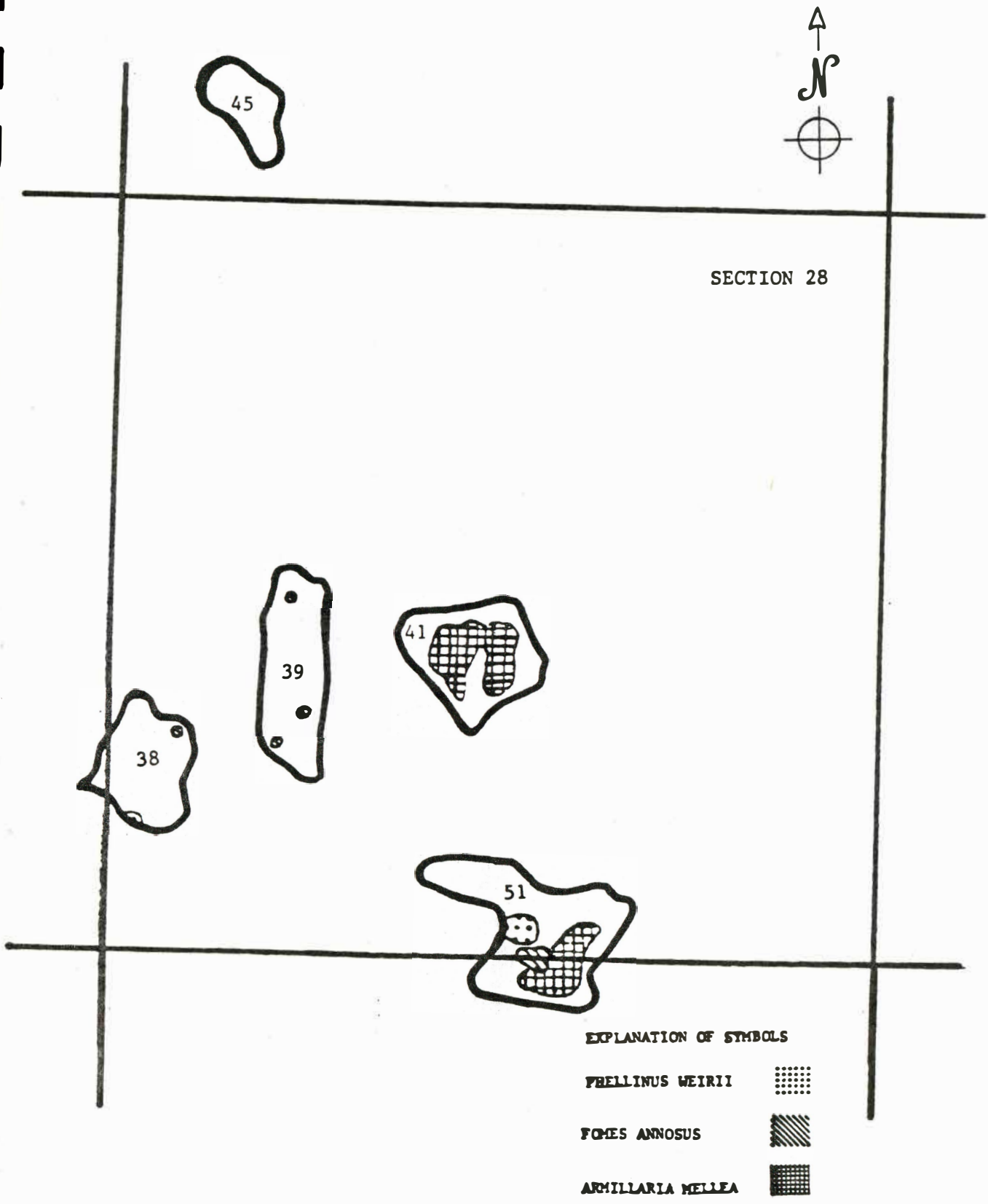
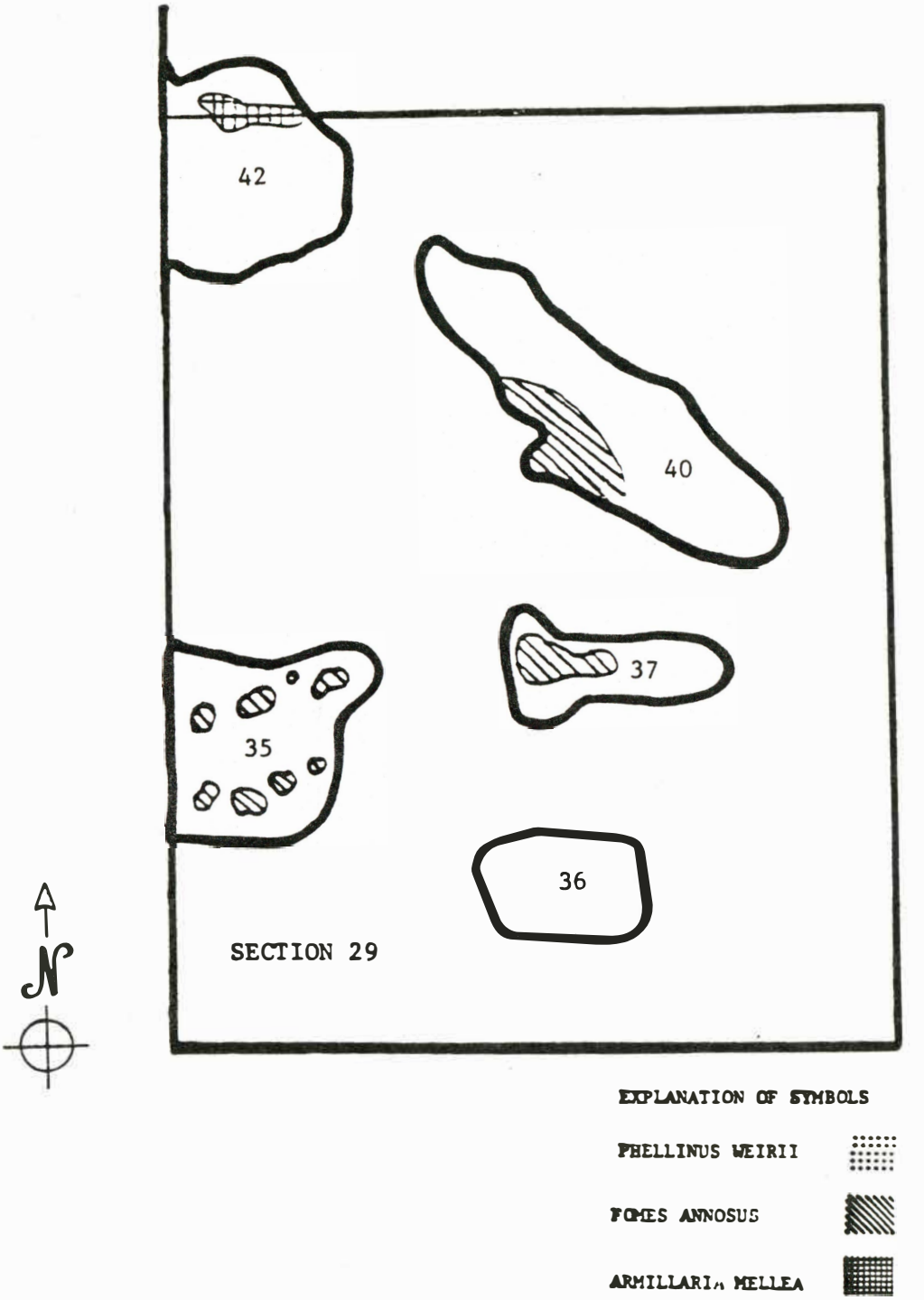


Figure 5. Location of root disease in section 29.



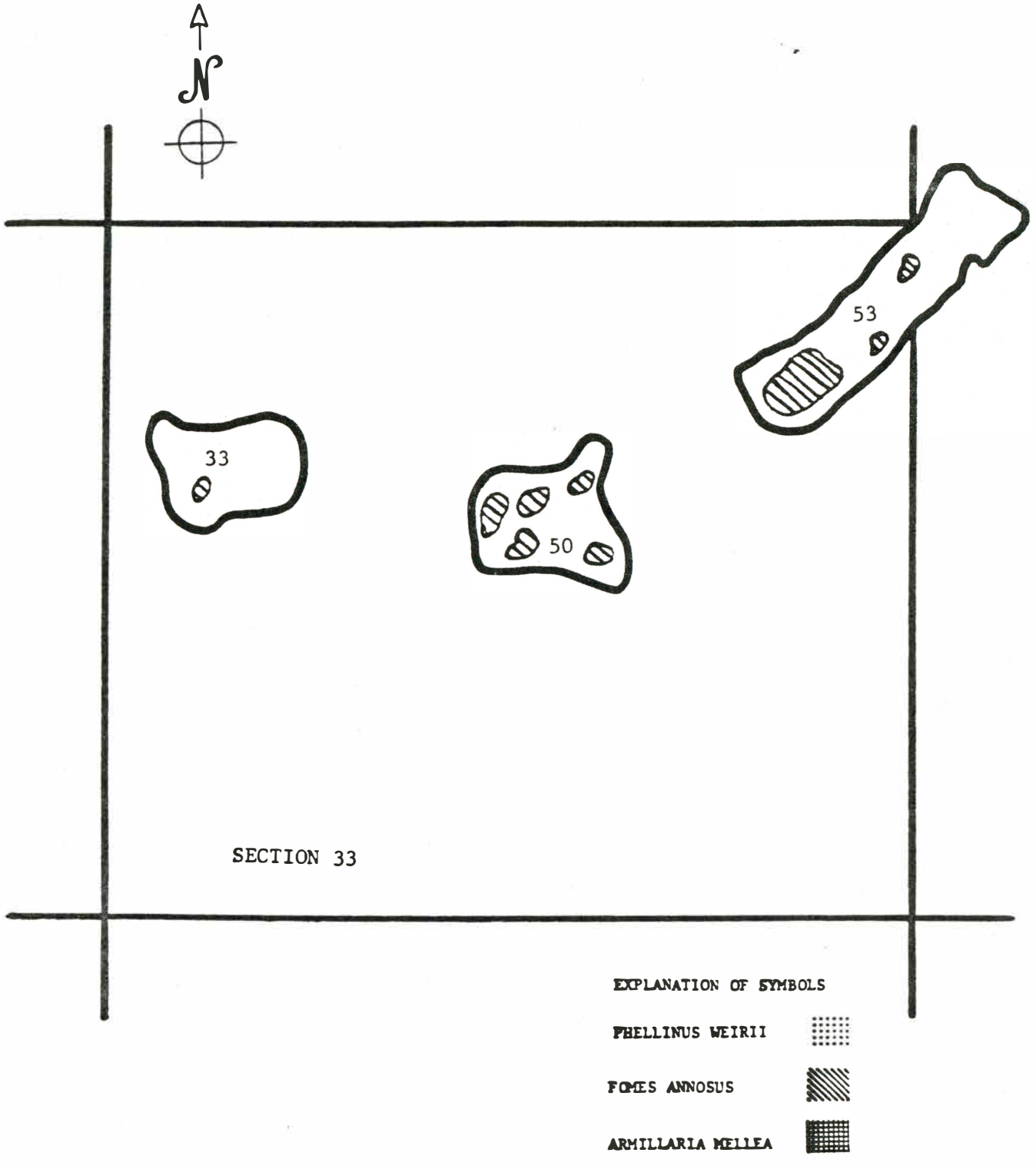


Figure 6. Location of root disease in section 33.

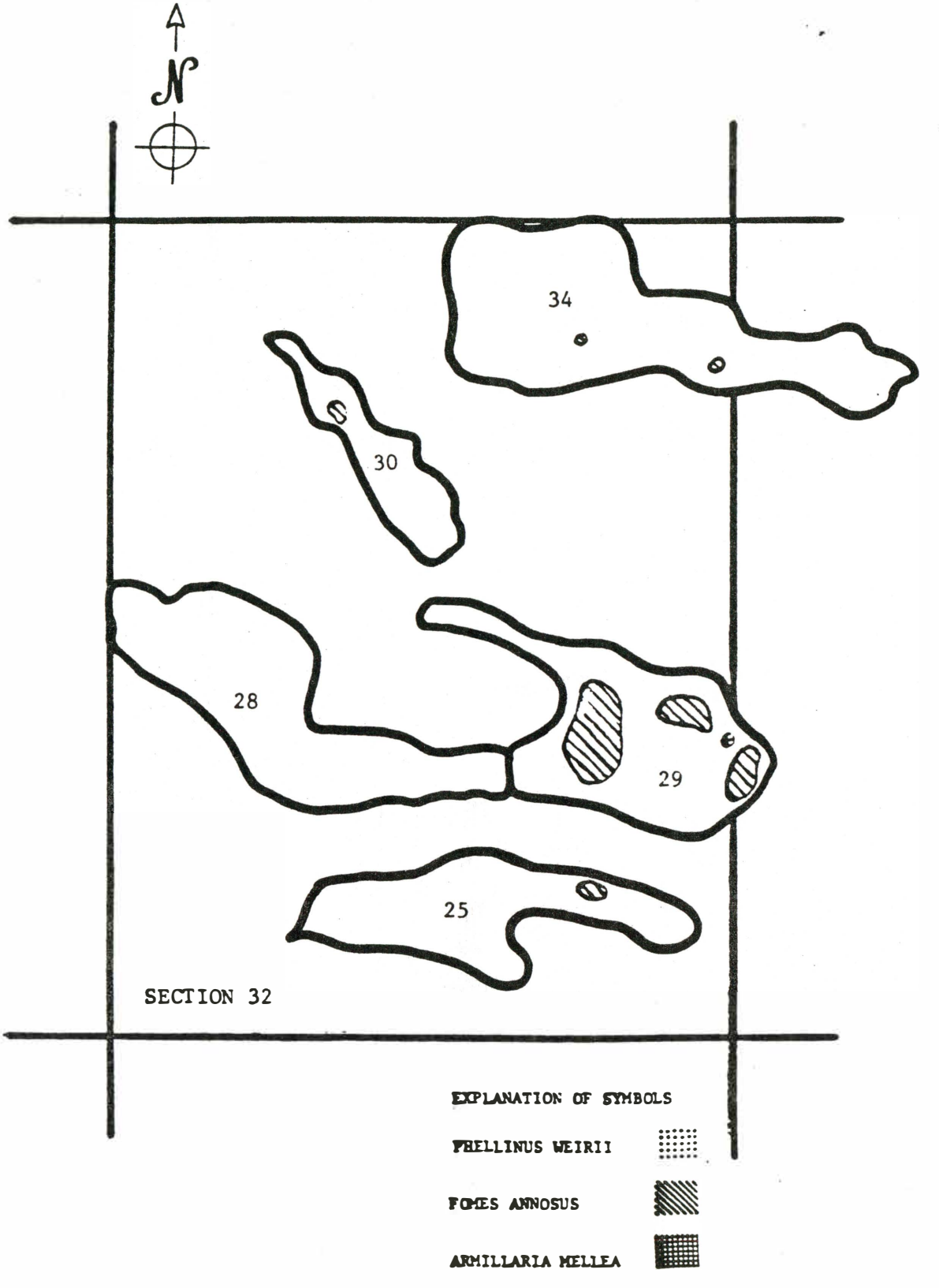
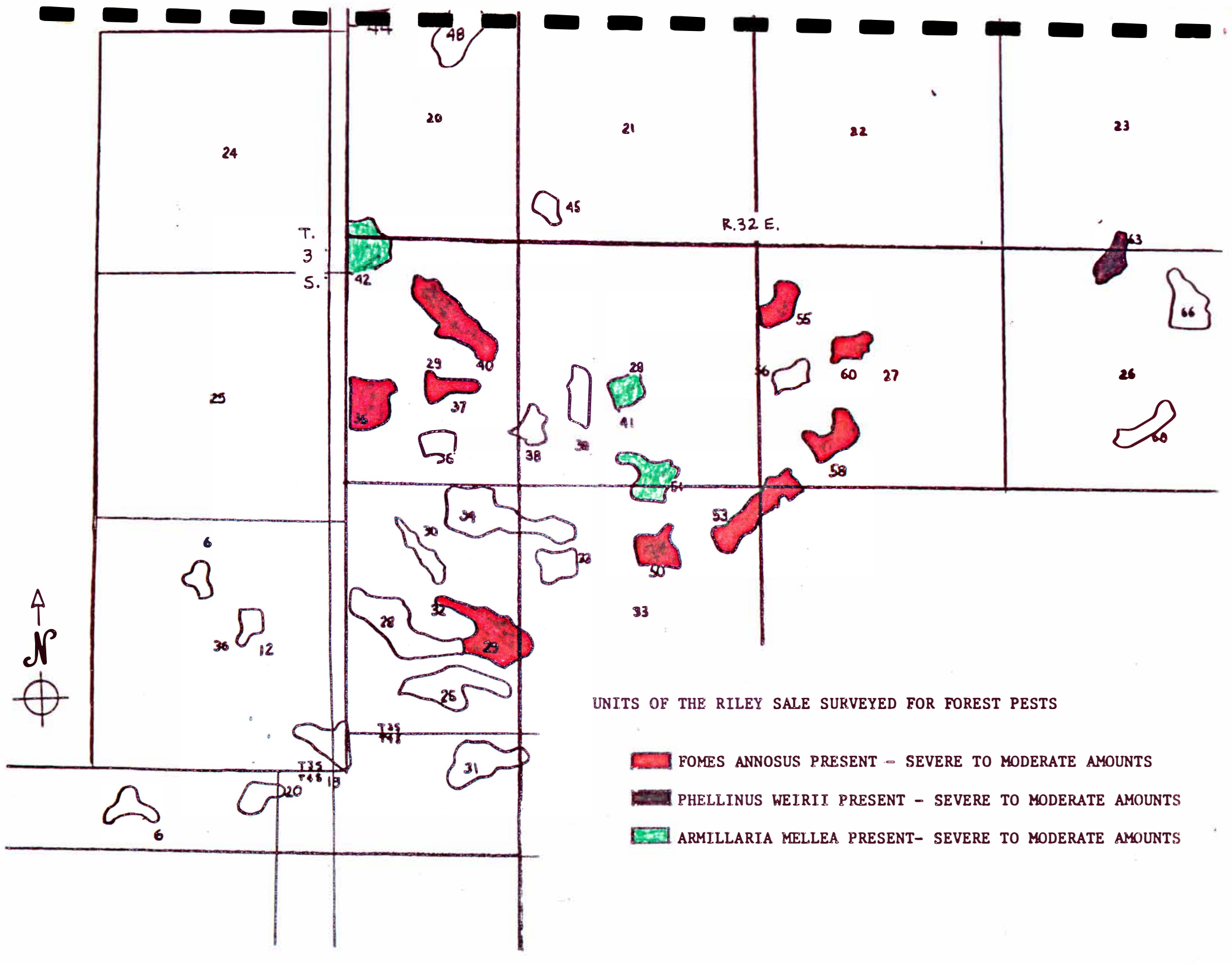


Figure 7. Location of root disease in section 32.


T. 3 S.
R.32 E.
UNITS OF THE RILEY SALE SURVEYED FOR FOREST PESTS
FOMES ANNOSUS PRESENT - SEVERE TO MODERATE AMOUNTS
PHELLINUS WEIRII PRESENT - SEVERE TO MODERATE AMOUNTS
ARMILLARIA MELLEA PRESENT- SEVERE TO MODERATE AMOUNTS